

WHAT IS CLAIMED IS:

1. An injection molding apparatus comprising:
  - a manifold member having a manifold melt channel for delivering a melt stream of moldable material through an outlet thereof;
  - a nozzle member having a nozzle melt channel for delivering the melt stream to a mold cavity;
  - a seal located at an interface between the manifold member and the nozzle member, the seal having a seal melt channel communicating at a first end with the manifold melt channel and at a second end with the nozzle melt channel for receiving the melt stream from the manifold melt channel and delivering the melt stream to the nozzle melt channel; and
  - a biasing element to maintain a continuous sealing pressure between the manifold and nozzle members independent of injection pressure.
2. The injection molding apparatus of claim 1, wherein the seal and biasing element are separately formed.
3. The injection molding apparatus of claim 1, wherein the seal and biasing element are integrally connected.
4. The apparatus of claim 1, wherein the seal is telescopically connected to the nozzle member.
5. The apparatus of claim 1 including, first and second biasing elements cooperating for biasing the seal against the other of the manifold and nozzle members, the first and second biasing elements having different pressure response characteristics.
6. The apparatus of claim 1, wherein the bias element includes a spring element.

7. The apparatus of claim 4, wherein the spring element is preloaded to apply the sealing pressure at a start-up temperature of the apparatus.

8. The apparatus of claim 1, wherein the seal is movable relative to one of the manifold member and the nozzle member.

9. The apparatus of claim 1, wherein said seal includes a tubular wall extending from a cylindrical ring, said tubular wall being at least partly received in said nozzle melt channel.

10. The apparatus of claim 9, wherein said biasing element is located between an upper surface of a nozzle head of said nozzle and said cylindrical ring of said seal.

11. The apparatus of claim 1, wherein the seal has a non-flat upper surface.

12. The apparatus of claim 11, wherein the manifold member further comprises a manifold seal insert that has a non-flat surface that engages the non-flat upper surface of the seal.

13. An injection molding apparatus comprising:  
a manifold having a manifold melt channel for receiving a melt stream of moldable material;  
a nozzle having a nozzle melt channel;  
a seal having a seal melt channel located between the nozzle melt channel and the manifold melt channel for delivering melt from said manifold melt channel to said nozzle melt channel; and

a biasing element that provides sealing contact between said seal and said manifold and said nozzle to maintain a sealed melt path between said manifold melt channel and said nozzle melt channel.

14. The apparatus of claim 13, wherein said seal is slidable relative to said manifold and said nozzle.

15. The apparatus of claim 14, wherein said seal telescopes within said nozzle melt channel.

16. A method of sealing a melt path between a manifold having a manifold melt channel and a nozzle having a nozzle melt channel of an injection molding apparatus, comprising:

providing a seal between the manifold and nozzle, at least a portion of the seal being movable in an axis parallel to a melt path flow direction through the nozzle melt channel, and having a seal melt channel in communication with each of the nozzle melt channel and the manifold melt channel; and

providing a biasing element to generate a sealing pressure between cooperating surfaces around the melt channels of the seal and at least one of the manifold and nozzle.

17. The method of claim 16, wherein the seal is telescopically mounted relative to the nozzle such that fluid communication is provided between the seal melt channel and the nozzle melt channel, and the sealing pressure is maintained between cooperating surfaces of the seal and manifold.

18. An injection molding apparatus comprising:  
a manifold having a manifold melt channel for receiving a melt stream of moldable material;  
a nozzle having a nozzle melt channel;

a seal having a seal melt channel located between the nozzle melt channel and the manifold melt channel; and

a biasing element that provides sealing contact between said seal and said manifold, wherein the biasing element is located outside the seal melt channel.

19. An injection molding apparatus comprising:

a manifold having a manifold melt channel for receiving a melt stream of moldable material;

a nozzle having a nozzle melt channel and a nozzle head portion;

a seal having a seal melt channel located between the nozzle melt channel and the manifold melt channel; and

a biasing element that makes a first contact with the nozzle head portion and a second contact with the seal to provide a sealing force between the nozzle seal and the manifold.